

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Hyong S. Kim, Robert D. Sansom, Lawrence R. Cleeton

WARNING: 37 C.F.R. § 1.41(a)(1) points out:

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(f) is filed supplying or changing the name or names of the inventor or inventors."

For (title): ATM TRAFFIC HAVING UNKNOWN CHARACTERISTICS INCLUDING TRAFFIC
WITH WEIGHTED PRIORITIES AND TRAFFIC WITHOUT WEIGHTED PRIORITIES

CERTIFICATION UNDER 37 C.F.R. 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date March 31, 1999 in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL262550754US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Tracey L. Milka

(type or print name of person mailing paper)

Tracey L. Milka

Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

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1. Type of Application

This new application is for a(n)

(check one applicable item below)

- ☒ Original (nonprovisional)
☐ Design
☐ Plant

WARNING: Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

WARNING: Do not use this transmittal for the filing of a provisional application.

NOTE: If one of the following 3 items apply, then complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED** and a **NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION**.

- ☐ Divisional.
☐ Continuation.
☐ Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

NOTE: A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. Each prior application must also be:

(i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or

(ii) Complete as set forth in § 1.51(b); or

(iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or

(iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(f) within the time period set forth in § 1.53(f).

37 C.F.R. § 1.78(a)(1).

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED**.

WARNING: If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

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WARNING: When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application **must** be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).

- ☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed

A. Required for filing date under 37 C.F.R. § 1.53(b) (Regular) or 37 C.F.R. § 1.153 (Design) Application

12 Pages of specification

6 Pages of claims

3 Sheets of drawing

- ☐ formal
☒ informal

B. Other Papers Enclosed

2 Pages of Abstract

0 Other

WARNING: **DO NOT** submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 CFR 1.84, see Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page . . ." 37 C.F.R. 1.84(c)).

(complete the following, if applicable)

- ☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

4. Additional papers enclosed

- ☐ Preliminary Amendment
☐ Information Disclosure Statement (37 C.F.R. 1.98)
☐ Form PTO-1449 (PTO/SB/08A and 08B)
☐ Citations
☐ Declaration of Biological Deposit
☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative
☐ Special Comments
☐ Other

5. Declaration or oath

NOTE: A newly executed declaration is not required in a continuation or divisional application provided that the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47, then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 C.F.R. §§ 1.63(d).

☒ Enclosed

Executed by

(check all applicable boxes)

☒ inventor(s).

☐ legal representative of inventor(s).
37 CFR 1.42 or 1.43.

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

☐ Not Enclosed.

NOTE: Where the filing is a completion in the U.S. of an International Application or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

☐ Application is made by a person authorized under 37 C.F.R. 1.41(c) on behalf of all the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

☐ Showing that the filing is authorized.
(not required unless called into question. 37 CFR 1.41(d))

6. Inventorship Statement

WARNING: If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

☒ The same.

or

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted.

☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).

☒ English

☐ Non-English

☐ The attached translation includes a statement that the translation is accurate. 37 C.F.R. 1.52(d).

8. Assignment

☒ An assignment of the invention to FORE Systems, Inc.

☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☐ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters—one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

☐ is (are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 C.F.R. 1.16)

A. ☒ Regular application

CLAIMS AS FILED			
Number filed	Number Extra	Rate	Basic Fee 37 C.F.R. 1.16(a) \$790.00
Total			
Claims (37 CFR 1.16(c)) $24 - 20 = 4$	\times	\$ 22.00	72.00
Independent			
Claims (37 CFR 1.16(b)) $4 - 3 = 1$	\times	\$ 82.00	78.00
Multiple dependent claim(s), if any (37 CFR 1.16(d))			
	$+$	\$270.00	

- ☐ Amendment cancelling extra claims is enclosed.
☐ Amendment deleting multiple-dependencies is enclosed.
☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation \$ 910.00

B. ☐ Design application
(\$330.00—37 CFR 1.16(f))

Filing Fee Calculation \$

C. ☐ Plant application
(\$540.00—37 CFR 1.16(g))

Filing fee calculation \$

11. Small Entity Statement(s)

- ☐ Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

WARNING: "Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 C.F.R. § 1.28(a)(2).

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(complete the following, if applicable)

- ☐ Status as a small entity was claimed in prior application
_____ / _____, filed on _____, from which benefit
is being claimed for this application under:

35 U.S.C. ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☐ A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ _____

NOTE: Any excess of the full fee paid will be refunded if small entity status is established and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 CFR 1.28(a).

12. Request for International-Type Search (37 C.F.R. 1.104(d))

(complete, if applicable)

- ☐ Please prepare an international-type search report for this application at the time
when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

- ☐ Not Enclosed

- ☐ No filing fee is to be paid at this time.

(This and the surcharge required by 37 C.F.R. 1.16(e) can be paid subsequently.)

- ☒ Enclosed

☒ Filing fee \$ 910.00

☒ Recording assignment
(\$40.00; 37 C.F.R. 1.21(h))
(See attached "COVER SHEET FOR
ASSIGNMENT ACCOMPANYING NEW
APPLICATION".) \$ 40.00

☐ Petition fee for filing by other than all the
inventors or person on behalf of the inventor
where inventor refused to sign or cannot be
reached
(\$130.00; 37 C.F.R. 1.47 and 1.17(i)) \$ _____

☐ For processing an application with a
specification in
a non-English language
(\$130.00; 37 C.F.R. 1.52(d) and 1.17(k)) \$ _____

☐ Processing and retention fee
(\$130.00; 37 C.F.R. 1.53(d) and 1.21(l)) \$ _____

☐ Fee for international-type search report
(\$40.00; 37 C.F.R. 1.21(e)) \$ _____

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NOTE: 37 CFR 1.21(f) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(f) and this, as well as the changes to 37 CFR 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(f) must be paid, within 1 year from notification under § 53(f).

Total fees enclosed

\$ 950.00

14. Method of Payment of Fees

- ☒ Check in the amount of \$ 910.00 & 40.00
- ☐ Charge Account No. _____ in the amount of \$ _____

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should not be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

- ☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 19-0737:

- ☒ 37 C.F.R. 1.16(a), (f) or (g) (filing fees)
- ☒ 37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

- ☐ 37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)
- ☐ 37 C.F.R. §§ 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).
- ☐ 37 C.F.R. 1.17 (application processing fees)

NOTE: ". . . A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

- ☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

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NOTE: 37 CFR 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 CFR 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

NOTE: ". . . Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☒ Credit Account No. 19-0737

☐ Refund



SIGNATURE OF PRACTITIONER

Reg. No. 30,587

Ansel M. Schwartz
(type or print name of attorney)

Tel. No. (412) 621-9222

One Sterling Plaza

Customer No.

P.O. Address
201 N. Craig Street, Suite 304
Pittsburgh, PA 15213

☒ **Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

- ☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added _____

- ☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added _____

- ☐ Plus added pages deleting names of inventor(s) named in prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added _____

- ☒ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added _____ 4

☐ **Statement Where No Further Pages Added**

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

- ☐ This transmittal ends with this page.

ATM TRAFFIC HAVING UNKNOWN CHARACTERISTICS INCLUDING
TRAFFIC WITH WEIGHTED PRIORITIES AND TRAFFIC
WITHOUT WEIGHTED PRIORITIES

FIELD OF THE INVENTION

5 The present invention is related to ATM traffic having unknown characteristics including traffic with weighted priorities and traffic without weighted priorities. More specifically, the present invention is related to UBR connection traffic with weighted priorities (UBRw VC) and the traffic having unknown characteristics without weighted priorities is UBR VC traffic.

BACKGROUND OF THE INVENTION

10 Although CBR, VBR, ABR and UBR traffic classes are designed to support existing and forthcoming services, it is difficult to take full advantage of such flexibility since many data services have unknown traffic characteristics. There is much confusion among users when they are asked to provide UPC parameters for their network services.

15 The UBR traffic class is specifically designed to provide data services with unknown traffic characteristics. No parameters need to be specified for UBR and it provides the simplest user interface. In fact, UBR is the dominant traffic class in most enterprise networks and in many of the Internet backbone networks built on ATM.

However, new specifications such as IEEE 802.1p/Q specification and IETF Differentiated Services (incorporated by reference herein) are being developed and will likely see widespread deployment over the coming years. Both of these specifications do not assume any knowledge of the traffic characteristic, only that some traffic is "more important", in some sense, than others. These service specifications do not directly map into any existing ATM service classes. (Note that the IETF Integrated Services specification already maps directly into ATM service classes since it assumes that the traffic can be specified.)

In the current ATM specification, there is no way of distinguishing data traffic priority within the UBR traffic class. In order to provide this support, the present invention pertains to a UBRw traffic class within UBR. It enables both IEEE 802.1p/Q and IETF Differentiated Services to map directly into the ATM UBR service class. Without the UBRw traffic class, ATM's growth in the Internet and enterprise network will be limited.

Some examples of such distinguished data traffic include:

- A set of network end-points with better than UBR traffic QOS with unspecified UPC parameters.
- A set of applications with better than UBR traffic QOS with unspecified UPC parameters.

- An ISP could offer different grades of services to customers who require UBR traffic class.
- Corporate VPNs can have different grades of services.

5 Together with ATM's scalability and manageability, UBRw service would be very attractive to many ISPs. It would also be equally beneficial in enterprise ATM networks.

10 The present invention describes UBRw, a weighted traffic service within the UBR traffic class. UBRw allows for support of both IEEE 802.1p/Q and IETF Differentiated Services traffic classes. In addition, it eases the problem of specifying UPC for services without well-known traffic characteristics but with relative priority requirements.

SUMMARY OF THE INVENTION

15 The present invention pertains to an ATM communication system. The system comprises a source which produces traffic for connections having known traffic characteristics and unknown traffic characteristics. The traffic has unknown characteristics including traffic with weighted priorities and traffic without
20 weighted priorities. The system comprises a network on which traffic travels. The source is connected to the network. The source sends the traffic having known traffic characteristics and unknown traffic characteristics onto the network. The system

comprises a destination which is connected to the network and receives the traffic having known traffic characteristics and unknown traffic characteristics.

5 The present invention pertains to a source for producing ATM traffic for a network with switches. The source comprises a mechanism which produces traffic for connections having unknown traffic characteristics. The traffic includes traffic with weighted priorities and traffic without weighted priorities. The source comprises a mechanism for transmitting the traffic to the network.

10 The present invention pertains to a switch for switching traffic on an ATM network from a source to a destination. The switch comprises a mechanism for receiving traffic for connections having unknown traffic characteristics. The traffic includes traffic with weighted priorities and traffic without weighted priorities. The switch comprises a mechanism for transmitting the traffic for connections to the network. The transmitting mechanism is connected to the receiving mechanism. The switch comprises a scheduler for scheduling when the connections having traffic with unknown characteristics having weighted priorities are to be
15 transmitted to the network. The scheduler is connected to the transmitting mechanism and the receiving mechanism.
20

The present invention pertains to a method for transferring traffic in an ATM communication system. The method comprises the steps of transmitting from a source traffic of a

connection having unknown traffic characteristics with a weighted priority onto an ATM network. Then there is the step of transmitting from the source traffic of another connection having unknown traffic characteristics without a weighted priority onto
5 the ATM network.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, the preferred embodiment of the invention and preferred methods of practicing the invention are illustrated in which:

10 Figure 1 is a schematic representation of a system of the present invention.

Figure 2 is a schematic representation of a source of the present invention.

15 Figure 3 is a schematic representation of a switch of the present invention.

Figure 4 is a flow chart of a method of the present invention.

Figure 5 is a schematic representation of scheduling of UBRw VCs in a switch.

DETAILED DESCRIPTION

Referring now to the drawings wherein like reference numerals refer to similar or identical parts throughout the several views, and more specifically to figure 1 thereof, there is shown an ATM communication system 10. The system 10 comprises a source 12 which produces traffic for connections having known traffic characteristics and unknown traffic characteristics. The traffic has unknown characteristics including traffic with weighted priorities and traffic without weighted priorities. The system 10 comprises a network 14 on which traffic travels. The source 12 is connected to the network 14. The source 12 sends the traffic having known traffic characteristics and unknown traffic characteristics onto the network 14. The system 10 comprises a destination 16 which is connected to the network 14 and receives the traffic having known traffic characteristics and unknown traffic characteristics. Preferably, the system 10 includes a switch 18 connected to the network 14 which switches the traffic from the source 12 to the destination 16.

The present invention pertains to a source 12, as shown in figure 2, for producing ATM traffic for a network 14 with switches 18. The source 12 comprises a mechanism which produces traffic for connections having unknown traffic characteristics. The traffic includes traffic with weighted priorities and traffic without weighted priorities. The source 12 comprises a mechanism for transmitting the traffic to the network 14.

Preferably, the connections with traffic having unknown characteristics with weighted priorities are UBR connection traffic with weighted priorities (UBRw VC) and the traffic having unknown characteristics without weighted priorities is UBR VC traffic. The
5 UBRw VC traffic preferably has multiple weighted priorities.

Preferably, the source 12 includes a mechanism for providing traffic having known traffic characteristics to the network 14. The traffic having known traffic characteristics is preferably either ABR, CBR, VBR or a combination of the same.
10 Preferably, the source 12 includes a mechanism which produces a signaling message that identifies to switches 18 of the network 14 the weight of each UBRw VC.

The weight of the UBRw VC preferably specifies a relative priority among UBR VC and UBRw VC traffic. Preferably, the UBRw
15 VCs having a higher weight receive a larger share of available bandwidth of the network 14. Each UBRw VC has preferably N bits associated with it which corresponds to the weight of its priority.

The present invention pertains to a switch 18, as shown in figure 3, for switching traffic on an ATM network 14 from a
20 source 12 to a destination 16. The switch 18 comprises a mechanism for receiving traffic for connections having unknown traffic characteristics. The traffic includes traffic with weighted priorities and traffic without weighted priorities. The switch 18 comprises a mechanism for transmitting the traffic for connections

to the network 14. The transmitting mechanism 22 is connected to the receiving mechanism 20. The switch 18 comprises a scheduler 24 for scheduling when the connections having traffic with unknown characteristics having weighted priorities are to be transmitted to the network 14. The scheduler 24 is connected to the transmitting mechanism 22 and the receiving mechanism 20.

Preferably, the connections with traffic having unknown characteristics with weighted priorities are UBR connection traffic with weighted priorities (UBRw VC) and the traffic having unknown characteristics without weighted priorities is UBR VC traffic.

The switch 18 preferably includes a memory 26 for storing the connections. The memory 26 is connected to the receiving mechanism 20, the scheduler 24 mechanism and the transmitting mechanism 22. Preferably, the memory 26 includes buffers 28 which are allocated according to the VC weight to give higher priority to the VCS with higher weight. The receiving mechanism 20 preferably also receives traffic having known characteristics of either ABR, CBR, VBR or a combination of the same. Preferably, the scheduler 24 utilizes weighted round robin scheduling to schedule when the UBRw VCs are to be transmitted by the transmitting mechanism 22.

The present invention pertains to a method, as shown in figure 4, for transferring traffic in an ATM communication system. The method comprises the steps of transmitting from a source traffic of a connection having unknown traffic characteristics

with a weighted priority onto an ATM network 14. Then there is the step of transmitting from the source 12 traffic of another connection having unknown traffic characteristics without a weighted priority onto the ATM network 14.

5 Before the step of transmitting the traffic of the connection having unknown traffic characteristics with a weighted priority, there is preferably the step of assigning a priority to the connection having unknown traffic characteristics with a weighted priority. Preferably, after the assigning step, there is the step of sending a signaling message from the source 12 to a switch 18 on the network 14 which is to receive the traffic of the connection having unknown traffic characteristics with a weighted priority so the switch 18 sets up a scheduling process corresponding with the weight of the priority of the connection
15 having unknown traffic characteristics with a weighted priority.

 The transmitting the traffic of the connection having unknown traffic characteristics with a weighted priority preferably includes the step of transmitting traffic of a UBR connection with a weighted priority (UBRw VC) and the step of transmitting traffic
20 of another connection having unknown traffic characteristics without a weighted priority includes the step of transmitting traffic of a UBR connection without a weighted priority (UBR VC).

 Preferably, after the assigning step, there is the step of transmitting from the source 12 traffic having known traffic

characteristics of either ABR, CBR, VBR or a combination of the same. After the transmitting the UBRw VC step, there is preferably the step of receiving the UBRw VC at the switch 18. Preferably, after the receiving step, there is the step of scheduling the UBRw VC for transmission by the switch 18 onto the network 14 toward a destination 16 based on weighted round robin.

In the operation of the preferred embodiment, the distinction between UBRw and UBR is that UBRw has multiple weighted priorities (N bits, where, for example, $N=8$) in terms of cell delivery. The given priority is only meaningful relative to other connections with lower or higher priority. It is not intended to provide loss nor delay guarantees. UBRw VC would be identical to UBR VC except that UBRw VC has a weight associated with it. These weights specify relative "importance" of the VC within UBR VCS. The weight of a priority class may be assigned so that the higher weighted UBRw VC gets bigger share of the available bandwidth than lower weighted VCS.

The weight of a UBRw VC is communicated to the switches 18. This can be done along the path during call set-up time. The weight information is to be included in the signaling message.

As an example, a call set-up and data transfer processes is described as follows.

A host requests a UBRw VC "A" with a weight of 8.

- Another host requests a UBRw VC "B" with a weight of 4.
- When each switch 18 in the path receives call set-up requests for VC "A" and VC "B", each switch 18 sets up a scheduling process with weight of 8 and 4 for VC "A" and VC "B" respectively.
- Although other scheduling algorithm could be used, let's assume a weighted round robin scheduling for simplicity in this example.
- The switch 18 with a weighted round robin scheduling will allocated weight of 8 and weight of 4 to VC "A" and "A" and "B". If we assume that the switch 18 has only two VCS ("A" and "B"), the scheduler 24 serves cells from VC "A" and "B" for 8 cycles and 4 cycles respectively (if cells are available).
- Thus, the cells from VC "A" are served twice as much as the cells from VC "B". Therefore, VC "A" gets more bandwidth than VC "B" proportional to their respective weights.
- Furthermore, buffers 28 in the switch 18 could be allocated according to VC weight to give higher priority to the VCS with higher weight as well.

Figure 5 shows the scheduling of UBRw VCS in the switch 18. The right side of figure 5 shows the transmission order of cells from VCS if $W_1=3$, $W_2=1$, and $W_n=4$. The scheduler 24 may also

serve cells in different order as long as the proportion of served cells matches the proportion of W_1 , W_2 , and W_n .

Once UBRw service is allowed in switches 18, IETF Differentiated Service and IEEE 802.1p/Q traffic can be easily mapped into ATM transport. UBRw would also help ISPs to offer different grade of services to their customers and make specification of UPC easy.

Although the invention has been described in detail in the foregoing embodiments for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations can be made therein by those skilled in the art without departing from the spirit and scope of the invention except as it may be described by the following claims.

WHAT IS CLAIMED IS:

1. An ATM communication system comprising:

a source which produces traffic for connections having known traffic characteristics and unknown traffic characteristics, said traffic having unknown characteristics including traffic with weighted priorities and traffic without weighted priorities;

a network on which traffic travels, said source connected to said network, said source sends said traffic having known traffic characteristics and unknown traffic characteristics onto the network; and

a destination which is connected to the network and receives the traffic having known traffic characteristics and unknown traffic characteristics.

2. A system as described in Claim 1 including a switch connected to the network which switches the traffic from the source to the destination.

3. A source for producing ATM traffic for a network with switches comprising:

a mechanism which produces traffic for connections having unknown traffic characteristics, said traffic including traffic

with weighted priorities and traffic without weighted priorities;
and

a mechanism for transmitting the traffic to the network.

4. A source as described in Claim 3 wherein the connections with traffic having unknown characteristics with weighted priorities are UBR connection traffic with weighted priorities (UBRw VC) and the traffic having unknown characteristics without weighted priorities is UBR VC traffic.

5. A source as described in Claim 4 wherein the UBRw VC traffic has multiple weighted priorities.

6. A source as described in Claim 5 including a mechanism for providing traffic having known traffic characteristics to the network.

7. A source as described in Claim 6 wherein the traffic having known traffic characteristics is either ABR, CBR, VBR or a combination of the same.

8. A source as described in Claim 7 including a mechanism which produces a signaling message that identifies to switches of the network the weight of each UBRw VC.

9. A source as described in Claim 8 wherein the weight of the UBRw VC specifies a relative priority among UBR VC and UBRw VC traffic.

10. A source as described in Claim 9 wherein the UBRw VCS having a higher weight receive a larger share of available bandwidth of the network.

11. A source as described in Claim 10 wherein each UBRw VC has N bits associated with it which corresponds to the weight of its priority.

12. A switch for switching traffic on an ATM network from a source to a destination comprising:

a mechanism for receiving traffic for connections having unknown traffic characteristics, said traffic including traffic with weighted priorities and traffic without weighted priorities;

a mechanism for transmitting the traffic for connections to the network, said transmitting mechanism connected to the receiving mechanism; and

a scheduler for scheduling when the connections having traffic with unknown characteristics having weighted priorities are to be transmitted to the network, said scheduler connected to the transmitting mechanism and the receiving mechanism.

13. A switch as described in Claim 12 wherein the connections with traffic having unknown characteristics with weighted priorities are UBR connection traffic with weighted priorities (UBRw VC) and the traffic having unknown characteristics without weighted priorities is UBR VC traffic.

14. A switch as described in Claim 13 including a memory for storing the connections, said memory connected to the receiving mechanism, the scheduler and the transmitting mechanism.

15. A switch as described in Claim 14 wherein the memory includes buffers which are allocated according to the VC weight to give higher priority to the VCS with higher weight.

16. A switch as described in Claim 15 wherein the receiving mechanism also receives traffic having known characteristics of either ABR, CBR, VBR or a combination of the same.

17. A switch as described in Claim 16 wherein the scheduler utilizes weighted round robin scheduling to schedule when the UBRw VCS are to be transmitted by the transmitting mechanism.

18. A method for transferring traffic in an ATM communication system comprising the steps of:

transmitting from a source traffic of a connection having unknown traffic characteristics with a weighted priority onto an ATM network; and

transmitting from the source traffic of another connection having unknown traffic characteristics without a weighted priority onto the ATM network.

19. A method as described in Claim 18 including before the step of transmitting the traffic of the connection having unknown traffic characteristics with a weighted priority, there is the step of assigning a priority to the connection having unknown traffic characteristics with a weighted priority.

20. A method has described in Claim 19 including after the assigning step, there is the step of sending a signaling message from the source to a switch on the network which is to receive the traffic of the connection having unknown traffic characteristics with a weighted priority so the switch sets up a scheduling process corresponding with the weight of the priority of the connection having unknown traffic characteristics with a weighted priority.

21. A method as described in Claim 20 wherein the transmitting the traffic of the connection having unknown traffic characteristics with a weighted priority includes the step of transmitting traffic of a UBR connection with a weighted priority

(UBRw VC) and the step of transmitting traffic of another connection having unknown traffic characteristics without a weighted priority includes the step of transmitting traffic of a UBR connection without a weighted priority (UBR VC).

22. A method as described in Claim 21 including after the assigning step, there is the step of transmitting from the source traffic having known traffic characteristics of either ABR, CBR, VBR or a combination of the same.

23. A method as described in Claim 22 including after the transmitting the UBRw VC step, there is the step of receiving the UBRw VC at the switch.

24. A method as described in Claim 22 including after the receiving step, there is the step of scheduling the UBRw VC for transmission by the switch onto the network toward a destination based on weighted round robin.

ABSTRACT OF THE DISCLOSURE

ATM TRAFFIC HAVING UNKNOWN CHARACTERISTICS INCLUDING
TRAFFIC WITH WEIGHTED PRIORITIES AND TRAFFIC
WITHOUT WEIGHTED PRIORITIES

An ATM communication system. The system includes a source which produces traffic for connections having known traffic characteristics and unknown traffic characteristics. The traffic has unknown characteristics including traffic with weighted priorities and traffic without weighted priorities. The system includes a network on which traffic travels. The source is connected to the network. The source sends the traffic having known traffic characteristics and unknown traffic characteristics onto the network. The system includes a destination which is connected to the network and receives the traffic having known traffic characteristics and unknown traffic characteristics. A source for producing ATM traffic for a network with switches. The source includes a mechanism which produces traffic for connections having unknown traffic characteristics. The traffic includes traffic with weighted priorities and traffic without weighted priorities. The source includes a mechanism for transmitting the traffic to the network. A switch for switching traffic on an ATM network from a source to a destination. The switch includes a mechanism for receiving traffic for connections having unknown traffic characteristics. The traffic includes traffic with weighted priorities and traffic without weighted priorities. The switch includes a mechanism for transmitting the traffic for connections

to the network. The transmitting mechanism is connected to the receiving mechanism. The switch includes a scheduler for scheduling when the connections having traffic with unknown characteristics having weighted priorities are to be transmitted to the network. The scheduler is connected to the transmitting mechanism and the receiving mechanism. A method for transferring traffic in an ATM communication system. The method includes the steps of transmitting from a source traffic of a connection having unknown traffic characteristics with a weighted priority onto an ATM network. Then there is the step of transmitting from the source traffic of another connection having unknown traffic characteristics without a weighted priority onto the ATM network.

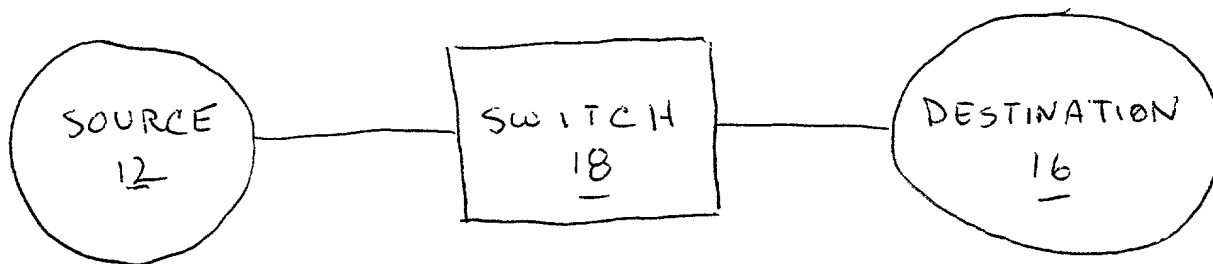


FIG 1

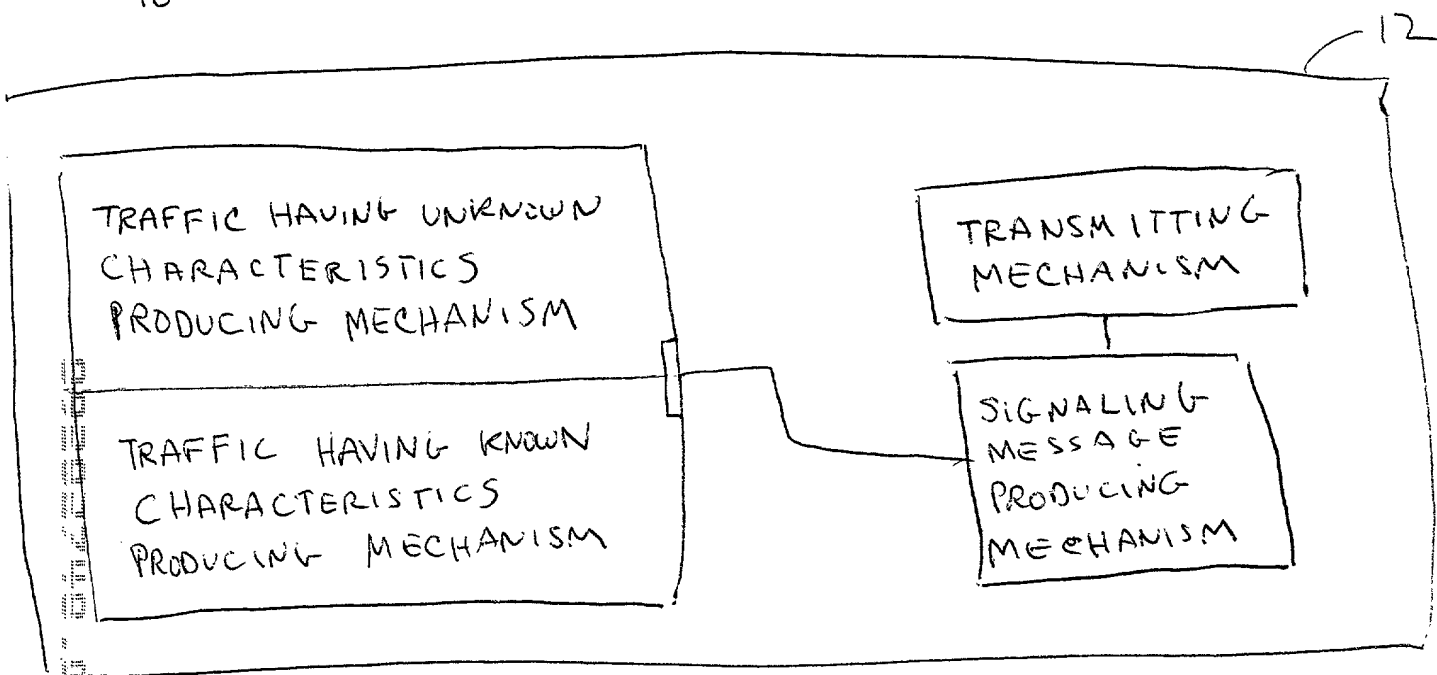


FIG 2

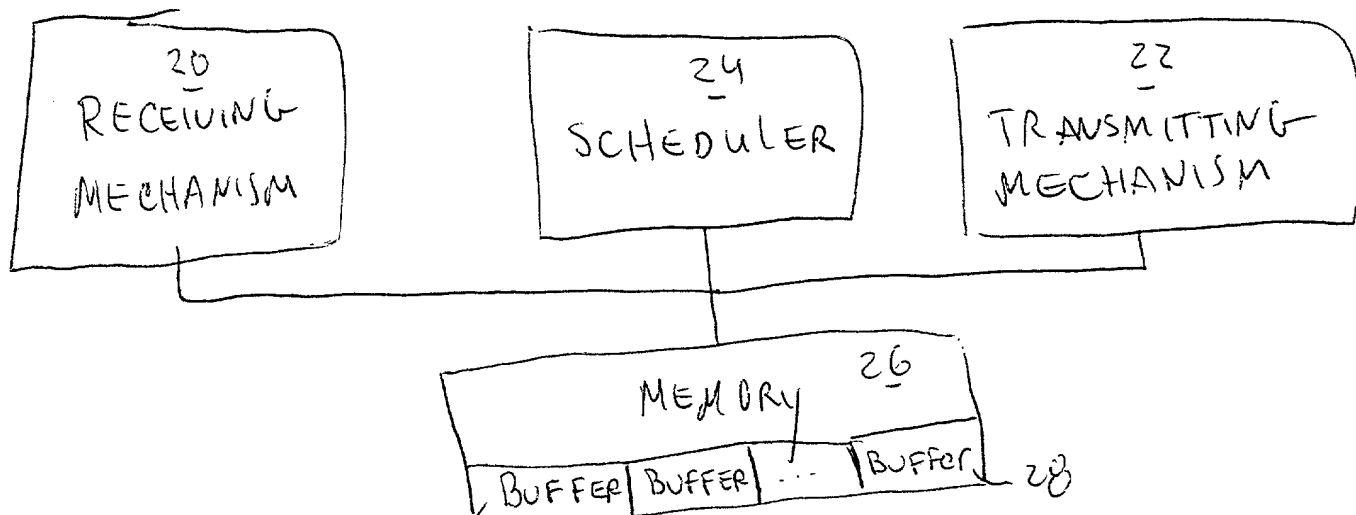


FIG 3

TRANSMITTING FROM A SOURCE TRAFFIC
HAVING UNKNOWN CHARACTERISTICS WITH
A WEIGHTED PRIORITY

TRANSMITTING FROM THE SOURCE TRAFFIC
HAVING UNKNOWN CHARACTERISTICS WITH
AN UNWEIGHTED PRIORITY

FIG 4

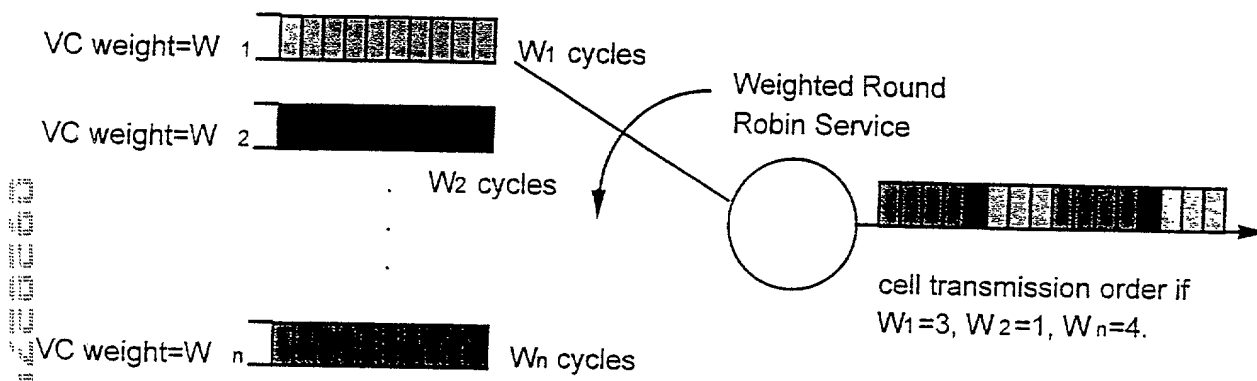


FIG 5

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

ATM TRAFFIC HAVING UNKNOWN CHARACTERISTICS INCLUDING TRAFFIC
the specification of which WITH WEIGHTED PRIORITIES AND TRAFFIC WITHOUT
WEIGHTED PRIORITIES
(check one)

☒ is attached hereto.

☐ was filed on _____ as

Application Serial No. 0 /

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

(Number) (Country) (Day/Month/Year Filed)

☐ Yes ☐ No

(Number) (Country) (Day/Month/Year Filed)

☐ Yes ☐ No

(Number) (Country) (Day/Month/Year Filed)

☐ Yes ☐ No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

[illegible]

Direct Telephone Calls to: (name and telephone number)

Full name of sole or first inventor
Hyoung S. Kim 3/31/99

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Full name of second joint inventor, if any
Robert D. Sansom

Second inventor's signature
Date

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(Supply similar information and signature for third and subsequent joint inventors.)

ADDED PAGE TO DECLARATION AND POWER OF ATTORNEY FOR PATENT
APPLICATION - THIRD AND SUBSEQUENT JOINT INVENTORS

Full name of third joint inventor Lawrence R. Cleeton
Inventor's signature _____ Date: _____
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Post Office Address 741 Bull Creek Road, Butler, PA 16002

Full name of fourth joint inventor _____
Inventor's signature _____ Date: _____
Residence _____
Citizenship _____
Post Office Address _____

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English Language Declaration

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the specification of which WITH WEIGHTED PRIORITIES AND TRAFFIC WITHOUT
WEIGHTED PRIORITIES

(check one)

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Application Serial No. 0 /

and was amended on _____
(if applicable)

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Priority Claimed

_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)

<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No

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Page 2 of 2

0 /
 (Application Serial No.) (Filing Date) (Status)
 (patented, pending, abandoned)

0 /
 (Application Serial No.) (Filing Date) (Status)
 (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Ansel M. Schwartz, Reg. No. 30,587

Send Correspondence to:

Ansel M. Schwartz

412/621-9222

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Full name of second joint inventor, if any	
Robert D. Sansom	
29 March 1999	
Second inventor's signature	Date
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Citizenship	
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(Supply similar information and signature for third and subsequent joint inventors.)

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APPLICATION - THIRD AND SUBSEQUENT JOINT INVENTORSFull name of third joint inventor Lawrence R. Cleeton

Inventor's signature _____ Date: _____

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Full name of fourth joint inventor _____

Inventor's signature _____ Date: _____

Residence _____

Citizenship _____

Post Office Address _____

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My residence, post office address and citizenship are as stated below next to my name.

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the specification of which WITH WEIGHTED PRIORITIES AND TRAFFIC WITHOUT
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☐ was filed on _____ as

Application Serial No. 0 /

and was amended on _____
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Priority Claimed

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_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)

<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No

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(patented, pending, abandoned)

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(patented, pending, abandoned)

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Citizenship	
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Full name of second joint inventor, if any	
Robert D. Sansom	
Second inventor's signature	Date
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Citizenship	
United Kingdom	
Post Office Address	
105 Fairway Lane, Pittsburgh, PA 15238	

(Supply similar information and signature for third and subsequent joint inventors.)

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Full name of third joint inventor Lawrence R. Cleeton
Inventor's signature *Lawrence R. Cleeton* Date: 3/31/99
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Citizenship United States
Post Office Address 741 Bull Creek Road, Butler, PA 16002

Full name of fourth joint inventor _____
Inventor's signature _____ Date: _____
Residence _____
Citizenship _____
Post Office Address _____